

**Appendix K**

**Detailed Cost-Effectiveness Analysis of  
Bulk and Cargo Ships**



## **Detailed Cost-Effectiveness Analysis of Bulk and Cargo Ships**

This appendix contains a more thorough discussion of the cost-effectiveness analyses conducted for bulk and cargo ships than what was provided in Chapter IX. For brevity and clarity, Chapter IX addressed NO<sub>x</sub> emissions reductions for bulk and cargo ships burning 0.1 percent sulfur distillate fuel, with the necessary electrical transformer located on the shore—the most likely scenario. Appendix K further addresses the reduction of other pollutants and the use of 0.5 percent sulfur distillate fuel.

Bulk and general cargo ships visit all ports in California and have the largest population of ships among the six ship categories, although as Table K-1 shows, many made only one or two visits. Furthermore, unlike with other ship categories, the cargos of the bulk ships are very diverse, making it more difficult to take advantage of any synergistic opportunities among ships visiting the same port. For example, a port may have three bulk cargo ships visit, but one of them is shipping newsprint, another gypsum, and yet another petroleum coke. These three ships would not visit the same berths to load or unload their cargo.

Bulk and general cargo ships have modest power needs, and those needs depend on whether the ships have onboard cranes that are used frequently. Power requirements can vary from 300 kW up to over 1 MW for ships equipped with cranes. For this analysis, staff assumed a hotelling load of 1 MW, with an average hotelling time of 77 hours. Although bulk ships visit Oakland, the bulk cargo is actually loaded at another port. These ships then visit Oakland, where containers are loaded onto their decks. Even though these ships are classified as bulk ships in the Lands Commission database, staff determined that the activity is container loading. Therefore, staff did not analyze bulk activity for Oakland.

Staff analyzed all ships and all ports for this category: 12 ports, 618 ships, and 1362 visits. As was done previously for other ship categories, for each port, cost-effectiveness values were determined for three scenarios: 1) all ships visiting the port are cold-ironed; 2) only ships that make three or more visits per year to a port are cold-ironed; and 3) only ships that make six or more visits per year to a port are cold-ironed. Only shore-side transformers were considered.

Tables K-1 and K-2 show the “all pollutants” cost-effectiveness values calculated for bulk and cargo ships visiting POLA/POLB and San Diego respectfully. ARB staff’s analysis for bulk ships initially focused on these three ports because of the relatively high ship activity and diversity of scenarios.

<b>Table K-1: All Pollutants Cost Effectiveness for Cold-Ironing Bulk Ships at POLA/POLB (Dollars/ton)</b>		
<b>Description</b>	<b>Distillate Fuel (0.5% Sulfur)</b>	<b>Distillate Fuel (0.1% Sulfur)</b>
<b><u>All Ships</u></b>		
--shore-side transformer	\$34,000	\$38,000
<b><u>Ships making 3 or more visits</u></b>		
--shore-side transformer	\$76,000	\$85,000
<b><u>Ships making 6 or more visits</u></b>		
--shore-side transformer	\$46,000	\$51,000

For the POLA/POLB analysis above, staff assumed that 32 berths would be retrofitted for the all-ship and the three-or-more-visits scenarios, assuming that the varied types of cargo and the specialized handling equipment warranted numerous berths. In the six-or-more-visits scenario, only eight berths were used because so few ships remained in the category.

<b>Table K-2: All Pollutants Cost Effectiveness for Cold-Ironing Bulk Ships at the Port of San Diego (Dollars/ton)</b>		
<b>Description</b>	<b>Distillate Fuel (0.5% Sulfur)</b>	<b>Distillate Fuel (0.1% Sulfur)</b>
<b><u>All Ships</u></b>		
--shore-side transformer	\$45,000	\$51,000
<b><u>Ships making 3 or more visits</u></b>		
--shore-side transformer	\$46,000	\$51,000
<b><u>Ships making 6 or more visits</u></b>		
--shore-side transformer	\$59,000	\$66,000

Table K-2 shows that, for the Port of San Diego, the average cost-effectiveness decreases as more ships are cold-ironed. Two berths are cold-ironed in the first two scenarios and only one in the third. Electricity costs are considerably higher in San Diego than at other ports, so operating costs are higher, especially when few ships are cold-ironed and demand charges represent a substantial portion of the total electrical bill.

Tables K-3 and K-4 show the average cost-effectiveness values based upon NOx-only emission reductions for the three ports.

<b>Table K-3: NOx Reduction Cost Effectiveness for Cold-Ironing Bulk Ships at POLA/POLB (Dollars/ton)</b>		
<b>Description</b>	<b>Distillate Fuel (0.5% Sulfur)</b>	<b>Distillate Fuel (0.1% Sulfur)</b>
<b><u>All Ships</u></b>		
--shore-side transformer	\$41,000	\$41,000
<b><u>Ships making 3 or more visits</u></b>		
--shore-side transformer	\$92,000	\$92,000
<b><u>Ships making 6 or more visits</u></b>		
--shore-side transformer	\$55,000	\$55,000

<b>Table K-4: NOx Reduction Cost Effectiveness for Cold-Ironing Bulk Ships at the Port of San Diego (Dollars/ton)</b>		
<b>Description</b>	<b>Distillate Fuel (0.5% Sulfur)</b>	<b>Distillate Fuel (0.1% Sulfur)</b>
<b><u>All Ships</u></b>		
--shore-side transformer	\$54,000	\$54,000
<b><u>Ships making 3 or more visits</u></b>		
--shore-side transformer	\$55,000	\$55,000
<b><u>Ships making 6 or more visits</u></b>		
--shore-side transformer	\$71,000	\$71,000

Finally, Tables K-5 and K-6 show the cost-effectiveness values based upon PM-only emission reductions. The cost-effectiveness values on a PM-reduction basis are substantial, because the Ocean-Going Vessel Auxiliary Engine Fuel regulation adopted by ARB in 2005 substantially reduced PM emissions. Otherwise, the cost-effectiveness values exhibit the same trends as seen in the earlier analyses.

<b>Table K-5: PM Reduction Cost Effectiveness for Cold-Ironing Bulk Ships at POLA/POLB (Dollars/ton)</b>		
<b>Description</b>	<b>Distillate Fuel (0.5% Sulfur)</b>	<b>Distillate Fuel (0.1% Sulfur)</b>
<b><u>All Ships</u></b>		
--shore-side transformer	\$1,500,000	\$2,400,000
<b><u>Ships making 3 or more visits</u></b>		
--shore-side transformer	\$3,500,000	\$5,300,000
<b><u>Ships making 6 or more visits</u></b>		
--shore-side transformer	\$2,100,000	\$3,200,000

<b>Table K-6: PM Reduction Cost Effectiveness for Cold-Ironing Bulk Ships at the Port of San Diego (Dollars/ton)</b>		
<b>Description</b>	<b>Distillate Fuel (0.5% Sulfur)</b>	<b>Distillate Fuel (0.1% Sulfur)</b>
<b><u>All Ships</u></b>		
--shore-side transformer	\$2,000,000	\$3,000,000
<b><u>Ships making 3 or more visits</u></b>		
--shore-side transformer	\$2,100,000	\$3,200,000
<b><u>Ships making 6 or more visits</u></b>		
--shore-side transformer	\$2,700,000	\$4,100,000

The prior analyses have all addressed *average* cost effectiveness. When cold-ironing all ships, these average values include many ships that visit a few times and a few ships that visit many times. The following analysis will address the cost effectiveness of cold-ironing an incremental ship if the shore-side infrastructure is already in place.

Table K-7 provides incremental cost-effectiveness values for NO<sub>x</sub> reductions only, PM reductions only, and “all pollutants” for bulk ships using 0.1 percent sulfur distillate fuel.

Not surprisingly, the incremental cost-effectiveness values drop significantly with more visits made by a ship. These incremental cost-effectiveness values may be somewhat misleading in that they assume the shore-side infrastructure has already been installed, which is less likely for this ship category than for others, such as container ships and passenger ships.

<b>Table K-7: Incremental Cost Effectiveness to Retrofit a Typical Bulk Ship Using Distillate Fuel (0.1% Sulfur) (Dollars/Ton)</b>			
<b>Visits</b>	<b>NOx</b>	<b>PM</b>	<b>All Pollutants</b>
1	\$59,000	\$3,500,000	\$55,000
2	\$30,000	\$1,800,000	\$29,000
3	\$21,000	\$1,300,000	\$20,000

Tables K-8 through K-34 contain the cost-effectiveness values for the other ports in California that are frequented by bulk ships for “all pollutants,” NOx, and PM. These ports include: Crockett, Carquinez, Hueneme, Humboldt, Redwood City, Richmond, San Francisco, Stockton, and Sacramento.

<b>Table K-8: All Pollutants Cost Effectiveness for Cold-Ironing Bulk Ships at Crockett (Dollars/ton)</b>		
<b>Description</b>	<b>Distillate Fuel (0.5% Sulfur)</b>	<b>Distillate Fuel (0.1% Sulfur)</b>
<b><u>All Ships*</u></b>		
--shore-side transformer	\$64,000	\$72,000

\* Reflects activity of one ship making eight visits. The cost-effectiveness values for the other two scenarios (ships making 3 visits or more and ships making 6 visits or more) would be the same.

<b>Table K-9: All Pollutants Cost Effectiveness for Cold-Ironing Bulk Ships at Carquinez (Dollars/ton)</b>		
<b>Description</b>	<b>Distillate Fuel (0.5% Sulfur)</b>	<b>Distillate Fuel (0.1% Sulfur)</b>
<b><u>All Ships</u></b>		
--shore-side transformer	\$38,000	\$43,000
<b><u>Ships making 3 or more visits*</u></b>		
--shore-side transformer	-	-
<b><u>Ships making 6 or more visits</u></b>		
--shore-side transformer	\$30,000	\$34,000

\* The ships that make three or more visits are also the same ships that make six or more visits.

<b>Table K-10: All Pollutants Cost Effectiveness for Cold-Ironing Bulk Ships at Port Hueneme (Dollars/ton)</b>		
<b>Description</b>	<b>Distillate Fuel (0.5% Sulfur)</b>	<b>Distillate Fuel (0.1% Sulfur)</b>
<b><u>All Ships</u></b>		
--shore-side transformer	\$49,000	\$55,000
<b><u>Ships making 3 or more visits</u></b>		
--shore-side transformer	\$60,000	\$68,000
<b><u>Ships making 6 or more visits*</u></b>		
--shore-side transformer	-	-

\* No ships made six or more visits to this port.



<b>Table K-11: All Pollutants Cost Effectiveness for Cold-Ironing Bulk Ships at the Port of Humboldt (Dollars/ton)</b>		
<b>Description</b>	<b>Distillate Fuel (0.5% Sulfur)</b>	<b>Distillate Fuel (0.1% Sulfur)</b>
<b><u>All Ships</u></b>		
--shore-side transformer	\$75,000	\$85,000
<b><u>Ships making 3 or more visits</u></b>		
--shore-side transformer	\$122,000	\$137,000
<b><u>Ships making 6 or more visits*</u></b>		
--shore-side transformer	-	-

\* No ships made six or more visits to this port.

<b>Table K-12: All Pollutants Cost Effectiveness for Cold-Ironing Bulk Ships at the Port of Redwood City (Dollars/ton)</b>		
<b>Description</b>	<b>Distillate Fuel (0.5% Sulfur)</b>	<b>Distillate Fuel (0.1% Sulfur)</b>
<b><u>All Ships</u></b>		
--shore-side transformer	\$63,000	\$71,000
<b><u>Ships making 3 or more visits</u></b>		
--shore-side transformer	\$104,000	\$117,000
<b><u>Ships making 6 or more visits</u></b>		
--shore-side transformer	\$51,000	\$58,000

<b>Table K-13: All Pollutants Cost Effectiveness for Cold-Ironing Bulk Ships at the Port of Richmond (Dollars/ton)</b>		
<b>Description</b>	<b>Distillate Fuel (0.5% Sulfur)</b>	<b>Distillate Fuel (0.1% Sulfur)</b>
<b><u>All Ships</u></b>		
--shore-side transformer	\$47,000	\$53,000
<b><u>Ships making 3 or more visits</u></b>		
--shore-side transformer	\$54,000	\$61,000
<b><u>Ships making 6 or more visits*</u></b>		
--shore-side transformer	-	-

\* No ships made six or more visits to this port.

<b>Table K-14: All Pollutants Cost Effectiveness for Cold-Ironing Bulk Ships at the Port of San Francisco (Dollars/ton)</b>		
<b>Description</b>	<b>Distillate Fuel (0.5% Sulfur)</b>	<b>Distillate Fuel (0.1% Sulfur)</b>
<b><u>All Ships</u></b>		
--shore-side transformer	\$39,000	\$43,000
<b><u>Ships making 3 or more visits</u></b>		
--shore-side transformer	\$39,000	\$44,000
<b><u>Ships making 6 or more visits</u></b>		
--shore-side transformer	\$26,000	\$30,000

<b>Table K-15: All Pollutants Cost Effectiveness for Cold-Ironing Bulk Ships at the Port of Sacramento (Dollars/ton)</b>		
<b>Description</b>	<b>Distillate Fuel (0.5% Sulfur)</b>	<b>Distillate Fuel (0.1% Sulfur)</b>
<b><u>All Ships</u></b>		
--shore-side transformer	\$90,000	\$101,000
<b><u>Ships making 3 or more visits</u></b>		
--shore-side transformer	\$132,000	\$149,000
<b><u>Ships making 6 or more visits*</u></b>		
--shore-side transformer	-	-

\* No ships made six or more visits to this port.

<b>Table K-16: All Pollutants Cost Effectiveness for Cold-Ironing Bulk Ships at the Port of Stockton (Dollars/ton)</b>		
<b>Description</b>	<b>Distillate Fuel (0.5% Sulfur)</b>	<b>Distillate Fuel (0.1% Sulfur)</b>
<b><u>All Ships</u></b>		
--shore-side transformer	\$93,000	\$105,000
<b><u>Ships making 3 or more visits</u></b>		
--shore-side transformer	\$168,000	\$189,000
<b><u>Ships making 6 or more visits*</u></b>		
--shore-side transformer	-	-

\* No ships made six or more visits to this port.

<b>Table K-17: NOx Reduction Cost Effectiveness for Cold-Ironing Bulk Ships at the Crockett (Dollars/ton)</b>		
<b>Description</b>	<b>Distillate Fuel (0.5% Sulfur)</b>	<b>Distillate Fuel (0.1% Sulfur)</b>
<b><u>All Ships*</u></b>		
--shore-side transformer	\$77,000	\$77,000

\*Reflects activity of one ship making eight visits. The cost-effectiveness values for the other two scenarios would be the same.

<b>Table K-18: NOx Reduction Cost Effectiveness for Cold-Ironing Bulk Ships at Carquinez (Dollars/ton)</b>		
<b>Description</b>	<b>Distillate Fuel (0.5% Sulfur)</b>	<b>Distillate Fuel (0.1% Sulfur)</b>
<b><u>All Ships</u></b>		
--shore-side transformer	\$46,000	\$46,000
<b><u>Ships making 3 or more visits*</u></b>		
--shore-side transformer	-	-
<b><u>Ships making 6 or more visits</u></b>		
--shore-side transformer	\$36,000	\$36,000

\* The ships that make three or more visits are also the same ships that make six or more visits

<b>Table K-19: NOx Reduction Cost Effectiveness for Cold-Ironing Bulk Ships at the Port Hueneme (Dollars/ton)</b>		
<b>Description</b>	<b>Distillate Fuel (0.5% Sulfur)</b>	<b>Distillate Fuel (0.1% Sulfur)</b>
<b><u>All Ships</u></b>		
--shore-side transformer	\$59,000	\$59,000
<b><u>Ships making 3 or more visits</u></b>		
--shore-side transformer	\$72,000	\$72,000
<b><u>Ships making 6 or more Visits*</u></b>		
--shore-side transformers	-	-

\* No ships made six or more visits to this port.

<b>Table K-20: NOx Reduction Cost Effectiveness for Cold-Ironing Bulk Ships at the Port of Humboldt (Dollars/ton)</b>		
<b>Description</b>	<b>Distillate Fuel (0.5% Sulfur)</b>	<b>Distillate Fuel (0.1% Sulfur)</b>
<b><u>All Ships</u></b>		
--shore-side transformer	\$91,000	\$91,000
<b><u>Ships making 3 or more visits</u></b>		
--shore-side transformer	\$147,000	\$147,000
<b><u>Ships making 6 or more visits*</u></b>		
--shore-side transformer	-	-

\* No ships made six or more visits to this port.

<b>Table K-21: NOx Reduction Cost Effectiveness for Cold-Ironing Bulk Ships at the Port of Redwood City (Dollars/ton)</b>		
<b>Description</b>	<b>Distillate Fuel (0.5% Sulfur)</b>	<b>Distillate Fuel (0.1% Sulfur)</b>
<b><u>All Ships</u></b>		
--shore-side transformer	\$76,000	\$76,000
<b><u>Ships making 3 or more visits</u></b>		
--shore-side transformer	\$125,000	\$125,000
<b><u>Ships making 6 or more visits</u></b>		
--shore-side transformer	\$62,000	\$62,000

<b>Table K-22: NOx Reduction Cost Effectiveness for Cold-Ironing Bulk Ships at the Port of Richmond (Dollars/ton)</b>		
<b>Description</b>	<b>Distillate Fuel (0.5% Sulfur)</b>	<b>Distillate Fuel (0.1% Sulfur)</b>
<b><u>All Ships</u></b>		
--shore-side transformer	\$57,000	\$57,000
<b><u>Ships making 3 or more visits</u></b>		
--shore-side transformer	\$66,000	\$66,000
<b><u>Ships making 6 or more visits*</u></b>		
--shore-side transformer	-	-

\* No ships made six or more visits to this port.

<b>Table K-23: NOx Reduction Cost Effectiveness for Cold-Ironing Bulk Ships at the Port of San Francisco (Dollars/ton)</b>		
<b>Description</b>	<b>Distillate Fuel (0.5% Sulfur)</b>	<b>Distillate Fuel (0.1% Sulfur)</b>
<b><u>All Ships</u></b>		
--shore-side transformer	\$47,000	\$47,000
<b><u>Ships making 3 or more visits</u></b>		
--shore-side transformer	\$47,000	\$47,000
<b><u>Ships making 6 or more visits</u></b>		
--shore-side transformer	\$32,000	\$32,000

<b>Table K-24: NOx Reduction Cost Effectiveness for Cold-Ironing Bulk Ships at the Port of Sacramento (Dollars/ton)</b>		
<b>Description</b>	<b>Distillate Fuel (0.5% Sulfur)</b>	<b>Distillate Fuel (0.1% Sulfur)</b>
<b><u>All Ships</u></b>		
--shore-side transformer	\$109,000	\$109,000
<b><u>Ships making 3 or more visits</u></b>		
--shore-side transformer	\$160,000	\$160,000
<b><u>Ships making 6 or more visits*</u></b>		
--shore-side transformer	-	-

\* No ships made six or more visits to this port.

<b>Table K-25: NOx Reduction Cost Effectiveness for Cold-Ironing Bulk Ships at the Port of Stockton (Dollars/ton)</b>		
<b>Description</b>	<b>Distillate Fuel (0.5% Sulfur)</b>	<b>Distillate Fuel (0.1% Sulfur)</b>
<b><u>All Ships</u></b>		
--shore-side transformer	\$113,000	\$113,000
<b><u>Ships making 3 or more visits</u></b>		
--shore-side transformer	\$202,000	\$202,000
<b><u>Ships making 6 or more visits*</u></b>		
--shore-side transformer	-	-

\* No ships made six or more visits to this port.

<b>Table K-26: PM Reduction Cost Effectiveness for Cold-Ironing Bulk Ships at Crockett (Dollars/ton)</b>		
<b>Description</b>	<b>Distillate Fuel (0.5% Sulfur)</b>	<b>Distillate Fuel (0.1% Sulfur)</b>
<b><u>All Ships*</u></b>		
--shore-side transformer	\$2,900,000	\$4,500,000

\* Reflects activity of one ship making eight visits. The cost-effectiveness values for the other two scenarios would be the same.



<b>Table K-27: PM Reduction Cost Effectiveness for Cold-Ironing Bulk Ships at Carquinez (Dollars/ton)</b>		
<b>Description</b>	<b>Distillate Fuel (0.5% Sulfur)</b>	<b>Distillate Fuel (0.1% Sulfur)</b>
<b><u>All Ships</u></b>		
--shore-side transformer	\$1,700,000	\$2,700,000
<b><u>Ships making 3 or more visits*</u></b>		
--shore-side transformer	-	-
<b><u>Ships making 6 or more visits</u></b>		
--shore-side transformer	\$1,400,000	\$2,100,000

\* The ships that make three or more visits are also the same ships that make six or more visits.

<b>Table K-28: PM Reduction Cost Effectiveness for Cold-Ironing Bulk Ships at the Port Hueneme (Dollars/ton)</b>		
<b>Description</b>	<b>Distillate Fuel (0.5% Sulfur)</b>	<b>Distillate Fuel (0.1% Sulfur)</b>
<b><u>All Ships</u></b>		
--shore-side transformer	\$2,200,000	\$3,400,000
<b><u>Ships making 3 or more visits</u></b>		
--shore-side transformer	\$2,700,000	\$4,200,000
<b><u>Ships making 6 or more visits*</u></b>		
--shore-side transformer	-	-

\* No ships made six or more visits to this port.

<b>Table K-29: PM Reduction Cost Effectiveness for Cold-Ironing Bulk Ships at the Port of Humboldt (Dollars/ton)</b>		
<b>Description</b>	<b>Distillate Fuel (0.5% Sulfur)</b>	<b>Distillate Fuel (0.1% Sulfur)</b>
<b><u>All Ships</u></b>		
--shore-side transformer	\$3,400,000	\$5,300,000
<b><u>Ships making 3 or more visits</u></b>		
--shore-side transformer	\$5,500,000	\$8,500,000
<b><u>Ships making 6 or more visits*</u></b>		
--shore-side transformer	-	-

\* No ships made six or more visits to this port.

<b>Table K-30: PM Reduction Cost Effectiveness for Cold-Ironing Bulk Ships at the Port of Redwood City (Dollars/ton)</b>		
<b>Description</b>	<b>Distillate Fuel (0.5% Sulfur)</b>	<b>Distillate Fuel (0.1% Sulfur)</b>
<b><u>All Ships</u></b>		
--shore-side transformer	\$2,900,000	\$4,400,000
<b><u>Ships making 3 or more visits</u></b>		
--shore-side transformer	\$4,700,000	\$7,300,000
<b><u>Ships making 6 or more visits</u></b>		
--shore-side transformer	\$2,300,000	\$3,600,000

<b>Table K-31: PM Reduction Cost Effectiveness for Cold-Ironing Bulk Ships at the Port of Richmond (Dollars/ton)</b>		
<b>Description</b>	<b>Distillate Fuel (0.5% Sulfur)</b>	<b>Distillate Fuel (0.1% Sulfur)</b>
<b><u>All Ships</u></b>		
--shore-side transformer	\$2,100,000	\$3,200,000
<b><u>Ships making 3 or more visits</u></b>		
--shore-side transformer	\$2,500,000	\$3,800,000
<b><u>Ships making 6 or more visits*</u></b>		
--shore-side transformer	-	-

\* No ships made six or more visits to this port.

<b>Table K-32: PM Reduction Cost Effectiveness for Cold-Ironing Bulk Ships at the Port of San Francisco (Dollars/ton)</b>		
<b>Description</b>	<b>Distillate Fuel (0.5% Sulfur)</b>	<b>Distillate Fuel (0.1% Sulfur)</b>
<b><u>All Ships</u></b>		
--shore-side transformer	\$1,800,000	\$2,700,000
<b><u>Ships making 3 or more visits</u></b>		
--shore-side transformer	\$1,800,000	\$2,700,000
<b><u>Ships making 6 or more visits</u></b>		
--shore-side transformer	\$1,200,000	\$1,900,000

<b>Table K-33: PM Reduction Cost Effectiveness for Cold-Ironing Bulk Ships at the Port of Sacramento (Dollars/ton)</b>		
<b>Description</b>	<b>Distillate Fuel (0.5% Sulfur)</b>	<b>Distillate Fuel (0.1% Sulfur)</b>
<b><u>All Ships</u></b>		
--shore-side transformer	\$4,100,000	\$6,300,000
<b><u>Ships making 3 or more visits</u></b>		
--shore-side transformer	\$6,000,000	\$9,300,000
<b><u>Ships making 6 or more visits*</u></b>		
--shore-side transformer	-	-

\* No ships made six or more visits to this port..

<b>Table K-34: PM Reduction Cost Effectiveness for Cold-Ironing Bulk Ships at the Port of Stockton (Dollars/ton)</b>		
<b>Description</b>	<b>Distillate Fuel (0.5% Sulfur)</b>	<b>Distillate Fuel (0.1% Sulfur)</b>
<b><u>All Ships</u></b>		
--shore-side transformer	\$4,200,000	\$6,600,000
<b><u>Ships making 3 or more visits</u></b>		
--shore-side transformer	\$7,600,000	\$12,000,000
<b><u>Ships making 6 or more visits*</u></b>		
--shore-side transformer	-	-

\* No ships made six or more visits to this port..